REMARKS

At the time of the Office Action dated December 30, 2004, claims 2-10 were pending. In this amendment, new claims 13 and 14 have been added to reinstate original claims 11 and 12 which were canceled by the Preliminary Amendment filed April 4, 2002. Care has been exercised to avoid the introduction of new matter.

Claims 2-10 have been rejected under 35 U.S.C. §103(a) as being obvious over Nakahata et al.

In paragraph 2 of the Office Action, the Examiner admitted, "Nakahata fails to disclose the use of a second order mode and the value of $2\pi \cdot H/\lambda_M = 5.0$ to 10.0."[1] However, the Examiner asserted, "it would have been obvious to define the second order mode and the value of $2\pi \cdot H/\lambda_M$, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art" by citing *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The Examiner further asserted, "[b]ased on the same teachings, the applicants are defining other values for the expression $2\pi \cdot H/\lambda_M$." This rejection is respectfully traversed.

A *prima facie* case of obviousness has not been established.

Applicants submit that the Examiner has not established a *prima facie* basis to deny patentability to the claimed invention under 35 U.S.C. §103 for lack of the requisite factual basis. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Based on this legal tenet, it is submitted that Nakahata et al. do not teach or suggest a surface acoustic wave device including all the limitations recited in claims 2-10. Specifically, as

[1] Claim 2 recites the value of $2\pi \cdot H/\lambda_M = 5.0 - 6.0$.

admitted by the Examiner, the reference does not teach combinations of surface acoustic wave modes and values of $2\pi \cdot H/\lambda_M$. Applicants have submitted herewith Table A to show differences between the claimed invention and what is disclosed in Nakahata et al. at a glance.

However, the Examiner apparently did not accord these differences sufficient consideration, but concluded that it would have been obvious to define modes of a surface acoustic wave and values of $2\pi \cdot H/\lambda_M$. To reach this conclusion, the Examiner has relied on the case of *In re Boesch* for the supposed rule that "discovering an optimum value of a result effective variable involves only routine skill in the art" (see paragraph 2 of the Office Action). In response, Applicants submit that *In re Boesch* is clearly distinguishable.

The court in the *In re Boesch* case apparently recognized that "[e]ach of the ranges of constituents in appellant's claimed alloys overlaps ranges disclosed by Pohlman et al. and Lamb." 205 USPQ at 219 (emphasis added). That is, composition requirements of the claims and the cited reference were overlapped with each other in the *In re Boesch* case. The court considered that overlap of the composition requirements of the claims and the cited references, and concluded, "[t]his accords with the rule that discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art." *Id.* It is stressed that the *In re Boesch* case should be applied to cases where a narrow range is selected from within a somewhat broader range disclosed in a prior art reference. *See In re Peterson*, 315 F.3d 1325, 65 USPQ2d 1379 (Fed. Cir. 2003).

Applicants invite the Examiner's attention to Table A. It is apparent that there is no overlapping ranges between the requirements of the claims and Nakahata et al. Specifically, claims 2, 4-8 and 10 recites the combination of the acoustic wave modes and values of $2\pi \cdot H/\lambda_M$ different from Nakahata et al. Even for claims 3 and 9, Nakahata et al. do not teach any

overlapping ranges of the values of $2\pi \cdot H/\lambda_M$. Accordingly, Nakahata's ranges neither encompass, nor overlap with, the claimed ranges. In this situation, it is factually and legally erroneous to conclude that one having ordinary skill in the art would somehow have been led to go outside of the disclosed ranges to optimize a variable. *Compare In re Peterson*, 315 F.3d 1325. Therefore, a *prima facie* case of obviousness has not been established.

Further, it is well established precedent that where the prior art disclosure suggests outer limits of a range of suitable values, and that the optimum resides within the range, and where there are indication elsewhere that in fact the optimum should be sought within that range, the determination of optimum values outside that range may not be obvious. *In re Sebek*, 465 F.2d 904, 175 USPQ 93 (CCPA 1972).

For example, Nakahata et al. discloses as follows:

> A surface acoustic wave device comprising a diamond or diamond-like carbon layer, a ZnO layer formed thereon and a comb-like electrode formed on the ZnO layer, which utilizes a third order mode of a surface acoustic wave which is excited in a structure which satisfies $(2\pi \cdot H/\lambda)$ of the ZnO layer=1.5-3.0. In relation to the propagation velocity v of the surface acoustic wave, preferably the $(2\pi \cdot H/\lambda)$ is smaller since the propagation velocity v is larger. For example, when $(2\pi \cdot H/\lambda)$ is 1.5, the velocity v is about 12,000 m/sec. Column 8, line 63 to column 9, line 5 (emphasis added).

The cited paragraph appears to teach layer structure and a mode of a surface acoustic wave of claim 3, but does not teach a value of $2\pi \cdot H/\lambda$ (see Table A, attached (claim 3 of the present application and claim 9 in Nakahata et al.). While claim 3 recites $2\pi \cdot H/\lambda_M = 6.0 - 8.5$, Nakahata et al. disclose $2\pi \cdot H/\lambda = 1.5 - 3.0$. Nakahata et al. further teaches that a smaller value of $2\pi \cdot H/\lambda$ is preferable in consideration of the propagation velocity v. Accordingly, Nakahata et al. do not teach or suggest the range of $2\pi \cdot H/\lambda_M$ in claim 3 which is outside of the disclosed range in the reference, but rather, teach the optimum resides within the disclosed range. This discussion can be applied to claim 9. Accordingly, the determination of optimum values outside

that range in Nakahata et al. would not have been obvious, and therefore, the claimed invention is not considered obvious over the reference. *In re Sebek*, 465 F.2d 904.

In addition, it is submitted that Nakahata et al. teach away from the claimed invention. As reproduced above, the reference especially teaches, "[i]n relation to the propagation velocity v of the surface acoustic wave, preferably $(2\pi \cdot H/\lambda)$ is smaller since the propagation velocity v is larger" (emphasis added) (see also column 6, lines 25-27 and 49-51; column 7, lines 3-5, 25-27 and 48-50; column 8, lines 3-5, 24-26 and 47-49; and column 9, lines 13-15, 39-41 and 62-64). In contrast, the claimed ranges of $2\pi \cdot H/\lambda_M$ are relatively greater. This teaching away from the claimed invention by the allegedly teaching reference constitutes potent evidence of nonobviousness. *See*, *Tec Air, Inc. v. Denso Mfg. Michigan, Inc.*, 192 F.3d 1353, 52 USPQ2d 1294 (Fed. Cir. 1999); *In re Bell*, 991 F.2d 781, 26 USPQ2d 1529 (Fed. Cir. 1993); *In re Hedges*, 783 F.2d 1038, 228 USPQ 685 (Fed. Cir. 1986); *W. L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983); *In re Marshall*, 578 F.2d 301, 198 USPQ 344 (CCPA 1978).

There is no prediction to change parameters.

In the statement of the rejection, the Examiner generalized by concluding that "discovering an optimum value of a result effective variable involves only routine skill in the art." But that generalization is, in this case, unrealistic, because it assumes routine implementation, which is not here the case. Applicants submit that finding the claimed surface acoustic wave modes and values of $2\pi \cdot H/\lambda_M$ is not within routine skill in the art for the reasons set forth below.

First, it is difficult for a person skilled in the art to estimate an electrical coupling coefficient K^2 in the case where a thickness H of the ZnO layer and a wavelength λ_M of the

surface acoustic wave are changed. It becomes more difficult to estimate the electrical coupling coefficient K^2 in various order surface acoustic waves. Accordingly, estimating an electrical coupling coefficient K^2 is not routine skill in the art.

Second, it is difficult for a person skilled in the art to make a value of $2\pi \cdot H/\lambda_M$ bigger by (1) having the ZnO layer with a thicker thickness H, or (2) having the surface acoustic wave with a shorter wavelength λ_M. Thus, it is difficult for him/her to predict performance of a flexibility surface wave element.

When the ZnO layer becomes thicker, directions of crystals go out of order. As a result, an electrical coupling coefficient K^2 decreases. Accordingly, it is difficult to make the ZnO layer thicker to make the value of $2\pi \cdot H/\lambda_M$ bigger.

On the other hand, to have the surface acoustic wave with a shorter wavelength λ_M, it is necessary to make a line width of electrodes narrower. However, because of a limitation of the processing technique, the wavelength λ_M cannot be reduced significantly to make the value of $2\pi \cdot H/\lambda_M$ bigger.

Accordingly, Applicants submit that it is far from routine, in deed it is complex and difficult for a person skilled in the art to predict changes of surface acoustic wave modes and values of $2\pi \cdot H/\lambda_M$. Therefore, there is no sufficient factual basis upon which, and it is unrealistic to, conclude that "discovering an optimum value of a result effective variable involves only routine skill in the art" in this case.

Conclusion.

Based upon the foregoing, Applicants submit that the Examiner has not established a *prima facie* basis to deny patentability to the claimed invention for lack of the requisite factual basis. Applicants, therefore, submit that the imposed rejection of claims 2-10 under 35 U.S.C.

§103 for obviousness predicated upon Nakahata et al. is not viable and, hence, respectfully solicit withdrawal thereof. It is also submitted that new claims 13 and 14 are patentable at least because those claims include all the limitations recited in any of claims 2-10.

It should, therefore, be apparent that the imposed rejections have been overcome and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, respectfully solicited.

Lastly, Applicants note that each claimed invention must be considered on its own merits and in every instance, the test for patentability under § 103 is the same: "whether the teachings of the prior art, taken as a whole, would have made obvious the claimed invention." *In re Gorman*, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). There are no per se rules of unpatentability. *In re Ochiai*, 71 F.3d 1565, 1572, 37 USPQ2d 1127, 1133 (Fed. Cir. 1995) ("The use of per se rules, while undoubtedly less laborious than a searching comparison of the claimed invention—including all its limitations—with the teachings of the prior art, flouts section 103 and the fundamental case law applying it."); *In re Cofer*, 354 F.2d 664, 667, 148 USPQ 268, 271 (CCPA 1966) ("[I]t is facts appearing in the record, rather than prior decisions in and of themselves, which must support the legal conclusion of obviousness under 35 U.S.C. § 103.").

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Attachment: Table A

Structure	Mode	$2\pi \cdot H/\lambda_M$: H = thickness of ZnO	Claims
Interdigital transducers /ZnO/Diamond	0th	0.5 - 1.5	Claim 7 in Nakahata
	1st	1.0 - 3.5	Claim 8 in Nakahata
	2nd	**5.0 - 6.0**	**Claim 2**
	3rd	**6.0 - 8.5**	**Claim 3**
		1.0 - 3.0	Claim 9 in Nakahata
	4th	**9.0 – 10.0**	**Claim 4**
ZnO/ Interdigital transducers /Diamond	0th	0.5 – 1.5	Claim 1 in Nakahata
	1st	0.3 – 2.0	Claim 2 in Nakahata
	3rd	2.5 ≤	Claim 3 in Nakahata
	5th	**7.7 – 9.5**	**Claim 5**
Short-circuit electrode/ZnO/ Interdigital transducers/Diamond	0th	0.5 – 1.5	Claim 4 in Nakahata
	1st	0.3 – 2.5	Claim 5 in Nakahata
	2nd	**7.2 – 8.5**	**Claim 6**
	3rd	2.5 ≤	Claim 6 in Nakahata
	5th	**7.8 – 9.5**	**Claim 7**
Interdigital transducers /ZnO/short-circuit electrode/Diamond	0th	0.5 – 1.5	Claim 10 in Nakahata
	1st	0.5 – 3.5	Claim 11 in Nakahata
	2nd	**4.8 – 6.0**	**Claim 8**
	3rd	**6.0 – 8.5**	**Claim 9**
		1.0 – 3.0	Claim 12 in Nakahta
	4th	**9.0 – 10.0**	**Claim 10**